P1

BRUHATH BANGALORE MAHANAGARA PALIKE
Byatarayanapura Division

Name of the work: Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

First and Part Bill
Test Reports

TEJUS
CONSULTANTS

Test Report on Cement

Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers and Project Pvt. Ltd.
Sample ID	Cement
Date of Sample Tested	02.06.2018
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	37Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	343Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	4mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	26.00%	25 % to 35

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ಸಹಾಯಕ ಅಧಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ.

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ, ಬೆಂಗಳೂರು-26

Authorised Signatory

TEJUS
CONSULTANTS

TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka developers and project pvt ltd

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	Fine aggregate (River Sand/ M sand)	**Proposed Use**	PCC
Location/Source	At Site/Plant	**Date of Sampling**	02.06.2018
Period of Soaking	24 hours	**Date of Testing**	02.06.2018

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	
A	Weight of sturated surface dry sample gm.	652	668	662	
B	Weight of oven - dry sample gm.	645	658	652	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1686	1698	1693	
E	Bulk specific gravity $\frac{B}{(C+A-D)}$	2.676	2.686	2.672	2.678
G	Absorption (%) $\frac{(A-B)*100}{B}$	1.085	1.520	1.534	1.380

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ಸಹಾಯಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

TEJUS CONSULTANTS

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Roads at Manjunatha Layout 1st , 2nd,3rd and 4th Cross in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	Tejus Consultants, Bangalore
Contractor	Benaka developers and project pvt ltd

SIEVE ANALYSIS

Total Weight:	**3000** gms				
Type of Material	**Fine aggregate (River Sand/ M sand)**		**Proposed Use**	PCC	
Sample Location	At Site/Plant		**Date of Sampling**	02.06.2018	
			Date of Testing	02.06.2018	
IS Sieve Size	**Weight Retained**	**Cum. Weight Retained**	**Cum. % Retained**	**Cum. % Passing**	**Spec. Limit (%) Passing (Zone-II)**
10.00 mm	0	0	0	100.00	**100**
4.75 mm	208	208	6.93	93.07	**90 - 100**
2.36 mm	306	514	17.13	82.87	**75 - 100**
1.18 mm	420	934	31.13	68.87	**55 - 90**
0.600 mm	482	1416	47.20	52.80	**35 -59**
0.300 mm	708	2124	70.80	29.20	**8-30**
0.150 mm	630	2754	91.80	8.20	**0 - 10**
Pan	246	3000			**-**

Remarks : Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhath Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers and Project Pvt. Ltd.
Total Weight in gm:	3000

SIEVE ANALYSIS

Type of Material	40 mm down size	**Proposed Use**	PCC
Sample Location	At Site/Plant	**Date of Sampling**	02.06.2018
		Date of Testing	02.06.2018

IS Sieve Size	Weight Retained in gm	Cum. Weight Retained in gm	Cumulative Weight Retained in %	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size
80.00mm	0	0	0.00	100.00	100
63.00mm	0	0	0.00	100.00	-
40.00mm	238	238	7.93	92.07	95-100
20.00mm	1253	1491	49.70	50.30	30-70
10.00mm	934	2425	80.83	19.17	10-35
4.75mm	462	2887	96.23	3.77	0-5
Pan	113	3000	100.00	0.00	

Remarks : ✓ Satisfactory / Not Satisfactory

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ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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Test Report on Cement

Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers and Project Pvt. Ltd.
Sample ID	Cement
Date of Sample Tested	11.06.2018
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	37 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	347	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	4mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	25 % to 35

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TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvement to Drains and Asphalting to Roads at Manjunatha Layout 1st , 2nd,3rd and 4th Cross in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka developers and project pvt ltd

SPECIFIC GRAVITY AND WATER ABSORPTION **FINE**
AGGREGATE (IS-2386-PART-3)

Type of Material	Fine aggregate (River Sand/ M sand)	**Proposed Use**	concrete
Location/Source	At Site/Plant	**Date of Sampling**	11.06.2018
Period of Soaking	24 hours	**Date of Testing**	11.06.2018

Sl. No.	Test Property		TRIAL - 1	TRIAL - 2	TRIAL - 3	
A	Weight of sturated surface dry sample gm.		648	678	658	
B	Weight of oven - dry sample gm.		641	670	648	
C	Weight of Pycnometer Filled with water gm		1275	1275	1275	
D	Weight of Pycnometer + sample + water gm		1682	1701	1690	
E	Bulk specific gravity	$\frac{B}{(C+A-D)}$	2.660	2.659	2.667	**2.662**
G	Absorption (%)	$\frac{(A-B)*100}{B}$	1.092	1.194	1.543	**1.276**

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	Tejus Consultants, Bangalore
Contractor	Benaka developers and project pvt ltd

SIEVE ANALYSIS

Total Weight:	**3000** gms		
Type of Material	**Fine aggregate (River Sand/ M sand)**	**Proposed Use**	concrete
Sample Location	At Site/Plant	**Date of Sampling**	11.06.2018
		Date of Testing	11.06.2018

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	**100**
4.75 mm	213	213	7.10	92.90	**90 - 100**
2.36 mm	308	521	17.37	82.63	**75 - 100**
1.18 mm	423	944	31.47	68.53	**55 - 90**
0.600 mm	484	1428	47.60	52.40	**35 -59**
0.300 mm	712	2140	71.33	28.67	**8-30**
0.150 mm	635	2775	92.50	7.50	**0 - 10**
Pan	225	3000			**-**

Remarks : ✓ Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike				
Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division				
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore				
Contractor	Benaka Developers and Project Pvt. Ltd.				
Total Weight:	10000	gms			

SIEVE ANALYSIS

Type of Material	20 mm down size	**Proposed Use**	Concrete	
Sample Location	Plant/At site	**Date of Sampling**	11.06.2018	
		Date of Testing	11.06.2018	

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
40.00 mm	0	0	0	100	100
20.00 mm	268	268	2.68	97.32	95 - 100
10.00 mm	4824	5092	50.92	49.08	25 - 55
4.75 mm	4227	9319	93.19	6.81	0 - 10
Pan	681	10000			

Remarks : ✓ Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike				
Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division				
Consultants	TEJUS CONSULTANTS				
Contractor	Benaka Developers and Project Pvt. Ltd.				
Total Weight:	10000	gms			

SIEVE ANALYSIS

Type of Material	**12.5 mm down size**		**Proposed Use**	Concrete	
Sample Location	At Site/Plant		**Date of Sampling**	11.06.2018	
			Date of Testing	11.06.2018	
IS Sieve Size (in mm)	**Weight Retained**	**Cum. Weight Retained**	**Cum. % Retained**	**Cum. % Passing**	**Spec. Limit (%) Passing**
20.0	0	0	0	100	**100**
12.5	547	547	5.47	94.53	**90-100**
10.0	4689	5236	52.36	47.64	**40-85**
4.75	4522	9758	97.58	2.42	**0-10**
Pan	242	10000			

Remarks : ✓ Satisfactory / Not Satisfactory

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TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers and Project Pvt. Ltd.
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	11.06.2018	18.06.2018	7 days	8.112	22500	280	12.44	12.52
2	11.06.2018	18.06.2018	7 days	8.128	22500	282	12.53	
3	11.06.2018	18.06.2018	7 days	8.137	22500	283	12.58	

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ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Project	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers and Project Pvt. Ltd.
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	11.06.2018	09.07.2018	28 days	8.136	22500	450	20.00	20.09
2	11.06.2018	09.07.2018	28 days	8.138	22500	452	20.09	
3	11.06.2018	09.07.2018	28 days	8.210	22500	454	20.18	

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	Project:3. Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers and Project Pvt. Ltd.		
Proposed Use	WMM	**Date of Sampling**	**04.07.2018**
Sample Location	**At plant**	**Date of Testing**	**04.07.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	355.00	349.00	352.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	274.00	279.00	275.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	81.00	70.00	77.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	22.82	20.06	21.88	
5	Average Aggregate impact value	(%)	21.58			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Project:3. Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	04.07.2018
		Date of Testing	04.07.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	852	75	777	50
16.0	12.5	1200	115	1085	120
12.5	10.0	451	76	375	62
10.0	6.3	501	65	436	38
Total		**3004**	**331**	**2673**	**270**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.02
Elongation Index(%):	10.10
Combined FI+EL (%)	21.12

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Project:3. Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	04.07.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	04.07.2018
Type of material & Purpose:	WMM	**Date of testing:**	04.07.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	616	616	6.16	93.84	95-100
22.4	2561	3177	31.77	68.23	60-80
11.2	1784	4961	49.61	50.39	40-60
4.75	1459	6420	64.20	35.80	25-40
2.36	1535	7955	79.55	20.45	15-30
0.6	861	8816	88.16	11.84	8.0-22.0
0.075	842	9658	96.58	3.42	0-8
Pan	342				
Total	10000				

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Project	**Project:3. Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**05.07.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6163	6112	6208
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9739	9734	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3426	3424	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.39	98.28	98.17
Compaction Required	98%	98%	98%

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	**Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**		
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**		
Consultant	**M/s Tejus Consultants**		
Contractor	**Benaka Developers & project .pvt .ltd**		
Proposed Use	BC	**Date of Sampling**	**07.07.2018**
Sample Location	At plant	**Date of Testing**	**07.07.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	394.00	379.00	385.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	308.00	296.00	298.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	86.00	83.00	87.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	21.83	21.90	22.60	
5	Average Aggregate impact value	(%)	22.11			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project :	**Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client :	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant :	**M/s Tejus Consultants**
Contractor:	**Benaka Developers and Project Pvt. Ltd.**

Type of Material	BC	**Proposed Use**	**BC**
Sample Location	At plant	**Date of Sampling**	**07.07.2018**
		Date of Testing	**07.07.2018**

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	626	75	551	60
16.0	12.5	1200	113	1087	81
12.5	10.0	501	74	427	58
10.0	6.3	500	74	426	46
Total		**2827**	**336**	**2491**	**245**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.89
Elongation Index(%):	9.84
Combined FI+EL (%)	21.72

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ಸಹಾಯಕ ಕಾರ್ಯ ಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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GRADATION FOR BC
(As per MORT&H 500-18,Grading-2)

Name of Work	:	**Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	07.07.2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	07.07.2018
Type of material & Purpose:	BC	Date of testing:	07.07.2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	139	139.0	11.58	88.42	79 - 100
9.50	105	244.0	20.33	79.67	71 - 95
4.75	222	466.0	38.83	61.17	53 - 71
2.360	124	590.0	49.17	50.83	42 - 58
1.180	129	719.0	59.92	40.08	34 - 48
0.600	101	820.0	68.33	31.67	26 - 38
0.300	109	929.0	77.42	22.58	18 - 28
0.150	85	1014.0	84.50	15.50	12 - 20
0.075	94	1108.0	92.33	7.67	4 - 10
Pan	92.0				
Total	1200.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work :	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	08.07.2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	952	921
2. Weight of Mixture after extraction, g	900	872
3. Weight of Bitumen	52	49
4. Weight of filter paper before extraction, g	2.00	2.00
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	1.40	1.70
7. Weight of Bitumen & fines	53.40	50.70
8. Bitumen content in %	5.61	5.50
9. Average Bitumen content in %	**5.56**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	At site	Date of Sampling:	08.07.2018
Type of material & Purpose:	**BC**	Date of testing:	08.07.2018
		Oven Dry Wt.(gms):	900.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	91	91.0	10.11	89.89	79 - 100
9.50	117	208.0	23.11	76.89	71 - 95
4.75	132	340.0	37.78	62.22	53 - 71
2.360	118	458.0	50.89	49.11	42 - 58
1.180	105	563.0	62.56	37.44	34 - 48
0.600	70	633.0	70.33	29.67	26 - 38
0.300	76	709.0	78.78	21.22	18 - 28
0.150	56	765.0	85.00	15.00	12 - 20
0.075	70	835.0	92.78	7.22	4 - 10
Pan	65.0				
Total	900.0				

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	08.07.2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.801	0.786	0.814
Final weight of plate after application of tack Coat (c)	Kg	0.824	0.809	0.837
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.250	0.256	0.251
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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PRECAST SLAB (CORE) TEST REPORT		
Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Name of Work	:	Improvement to Drains and Asphalting to Road at Defence Layout and Fathima Layout Main Road and Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
No.of Sample Tested	:	3
Date of Testing	:	18.06.2018
Techinical Reference	:	**IS:516-1959 (Reaffirmed 1999), SP-24:1983.**
Grade of Concrete	:	$M_{20 - 250}$mm thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50	90	0.43	2433.3	1.80	0.96	37.35	19.022	20.544	19.722	24.653
2	50	90	0.435	2461.6	1.80	0.96	36.58	18.630	20.120	19.316	24.145
3	50	90	0.438	2478.57	1.80	0.96	37.62	19.160	20.692	19.865	24.831

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BRUHATH BANGALORE MAHANAGARA PALIKE
Byatarayanapura Division

Name of the work: Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

First and Part Bill
Test Reports

AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

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Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers and Project Pvt. Ltd.		
Proposed Use	WMM	**Date of Sampling**	**31.07.2018**
Sample Location	**At plant**	**Date of Testing**	**31.07.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	359.00	345.00	353.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	270.00	278.00	275.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	89.00	67.00	78.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	24.79	19.42	22.10	
5	Average Aggregate impact value	(%)	22.10			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

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Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers and Project Pvt. Ltd.		
Proposed Use	WMM	**Date of Sampling**	**02.08.2018**
Sample Location	**At plant**	**Date of Testing**	**02.08.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	356.00	341.00	352.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	270.00	278.00	275.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	86.00	63.00	77.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	24.16	18.48	21.88	
5	Average Aggregate impact value	(%)	21.50			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	31.07.2018
		Date of Testing	31.07.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	859	77	782	57
16.0	12.5	1200	117	1083	120
12.5	10.0	450	76	374	62
10.0	6.3	501	65	436	39
Total		**3010**	**335**	**2675**	**278**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.13
Elongation Index(%):	10.39
Combined FI+EL (%)	21.52

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	31.07.2018
		Date of Testing	31.07.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	860	79	781	57
16.0	12.5	1200	117	1083	120
12.5	10.0	450	76	374	62
10.0	6.3	501	65	436	39
Total		**3011**	**337**	**2674**	**278**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.19
Elongation Index(%):	10.40
Combined FI+EL (%)	21.59

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	02.08.2018
		Date of Testing	02.08.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	859	77	782	59
16.0	12.5	1200	117	1083	120
12.5	10.0	450	76	374	62
10.0	6.3	501	65	436	39
Total		**3010**	**335**	**2675**	**280**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.13
Elongation Index(%):	10.47
Combined FI+EL (%)	21.60

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬೆಂಗಳೂರು-26

Authorised Signatory

TEJUS
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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	02.08.2018
		Date of Testing	02.08.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	859	77	782	57
16.0	12.5	1200	117	1083	126
12.5	10.0	450	76	374	62
10.0	6.3	501	65	436	39
Total		**3010**	**335**	**2675**	**284**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.13
Elongation Index(%):	10.62
Combined FI+EL (%)	21.75

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Authorised Signatory

TEJUS
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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	31.07.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	31.07.2018
Type of material & Purpose:	WMM	**Date of testing:**	31.07.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	618	618	6.18	93.82	95-100
22.4	2525	3143	31.43	68.57	60-80
11.2	1782	4925	49.25	50.75	40-60
4.75	1452	6377	63.77	36.23	25-40
2.36	1354	7731	77.31	22.69	15-30
0.6	862	8593	85.93	14.07	8.0-22.0
0.075	842	9435	94.35	5.65	0-8
Pan	565				
Total	10000				

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	31.07.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	31.07.2018
Type of material & Purpose:	WMM	**Date of testing:**	31.07.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	614	614	6.14	93.86	95-100
22.4	2525	3139	31.39	68.61	60-80
11.2	1782	4921	49.21	50.79	40-60
4.75	1452	6373	63.73	36.27	25-40
2.36	1354	7727	77.27	22.73	15-30
0.6	862	8589	85.89	14.11	8.0-22.0
0.075	842	9431	94.31	5.69	0-8
Pan	569				
Total	10000				

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	31.07.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	31.07.2018
Type of material & Purpose:	WMM	**Date of testing:**	31.07.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	617	617	6.17	93.83	95-100
22.4	2525	3142	31.42	68.58	60-80
11.2	1782	4924	49.24	50.76	40-60
4.75	1452	6376	63.76	36.24	25-40
2.36	1354	7730	77.30	22.70	15-30
0.6	862	8592	85.92	14.08	8.0-22.0
0.075	842	9434	94.34	5.66	0-8
Pan	566				
Total	10000				

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	02.08.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	02.08.2018
Type of material & Purpose:	WMM	**Date of testing:**	02.08.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	621	621	6.21	93.79	95-100
22.4	2525	3146	31.46	68.54	60-80
11.2	1782	4928	49.28	50.72	40-60
4.75	1457	6385	63.85	36.15	25-40
2.36	1359	7744	77.44	22.56	15-30
0.6	869	8613	86.13	13.87	8.0-22.0
0.075	842	9455	94.55	5.45	0-8
Pan	545				
Total	10000				

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	02.08.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	02.08.2018
Type of material & Purpose:	WMM	**Date of testing:**	02.08.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	619	619	6.19	93.81	95-100
22.4	2525	3144	31.44	68.56	60-80
11.2	1788	4932	49.32	50.68	40-60
4.75	1452	6384	63.84	36.16	25-40
2.36	1354	7738	77.38	22.62	15-30
0.6	862	8600	86.00	14.00	8.0-22.0
0.075	842	9442	94.42	5.58	0-8
Pan	558				
Total	10000				

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Project	**Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**		
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**		
Consultant	**M/s Tejus Consultants**		
Contractor	**Benaka Developers and Project Pvt. Ltd.**		
Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Date of Testing	**01.08.2018**		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6173	6118	6209
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3429	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.46	98.32	98.18
Compaction Required	98%	98%	98%

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Project	**Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**01.08.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6173	6118	6209
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3429	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.46	98.32	98.18
Compaction Required	98%	98%	98%

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work :	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	03.08.2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	950	925
2. Weight of Mixture after extraction, g	900	877
3. Weight of Bitumen	50	48
4. Weight of filter paper before extraction, g	2.00	2.00
4. Weight of filter paper before extraction, g	4.10	4.00
6. Weight of fines, g	1.40	2.00
7. Weight of Bitumen & fines	51.40	50.00
8. Bitumen content in %	5.41	5.41
9. Average Bitumen content in %	**5.41**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION
(As per MORT&H 500-18,Grading-2)

Sample Location:	At site	Date of Sampling:	03.08.2018
Type of material & Purpose:	**BC**	Date of testing:	03.08.2018
		Oven Dry Wt.(gms):	900.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	91	91.0	10.11	89.89	79 - 100
9.50	117	208.0	23.11	76.89	71 - 95
4.75	132	340.0	37.78	62.22	53 - 71
2.360	118	458.0	50.89	49.11	42 - 58
1.180	105	563.0	62.56	37.44	34 - 48
0.600	70	633.0	70.33	29.67	26 - 38
0.300	76	709.0	78.78	21.22	18 - 28
0.150	56	765.0	85.00	15.00	12 - 20
0.075	70	835.0	92.78	7.22	4 - 10
Pan	65.0				
Total	900.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work :	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	04.08.2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	953	921
2. Weight of Mixture after extraction, g	903	873
3. Weight of Bitumen	50	48
4. Weight of filter paper before extraction, g	2.00	2.00
4. Weight of filter paper before extraction, g	4.10	4.00
6. Weight of fines, g	1.60	1.70
7. Weight of Bitumen & fines	51.60	49.70
8. Bitumen content in %	5.41	5.40
9. Average Bitumen content in %	**5.41**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	At site	Date of Sampling:	04.08.2018
Type of material & Purpose:	**BC**	Date of testing:	04.08.2018
		Oven Dry Wt.(gms):	903.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	91	91.0	10.08	89.92	79 - 100
9.50	117	208.0	23.03	76.97	71 - 95
4.75	132	340.0	37.65	62.35	53 - 71
2.360	118	458.0	50.72	49.28	42 - 58
1.180	105	563.0	62.35	37.65	34 - 48
0.600	70	633.0	70.10	29.90	26 - 38
0.300	76	709.0	78.52	21.48	18 - 28
0.150	56	765.0	84.72	15.28	12 - 20
0.075	70	835.0	92.47	7.53	4 - 10
Pan	68.0				
Total	903.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work :	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	04.08.2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	955	926
2. Weight of Mixture after extraction, g	905	878
3. Weight of Bitumen	50	48
4. Weight of filter paper before extraction, g	2.00	2.00
4. Weight of filter paper before extraction, g	4.10	4.00
6. Weight of fines, g	1.60	2.00
7. Weight of Bitumen & fines	51.60	50.00
8. Bitumen content in %	5.40	5.40
9. Average Bitumen content in %	**5.40**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	At site	Date of Sampling:	04.08.2018
Type of material & Purpose:	BC	Date of testing:	04.08.2018
		Oven Dry Wt.(gms):	905.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	91	91.0	10.06	89.94	79 - 100
9.50	117	208.0	22.98	77.02	71 - 95
4.75	132	340.0	37.57	62.43	53 - 71
2.360	118	458.0	50.61	49.39	42 - 58
1.180	105	563.0	62.21	37.79	34 - 48
0.600	70	633.0	69.94	30.06	26 - 38
0.300	76	709.0	78.34	21.66	18 - 28
0.150	56	765.0	84.53	15.47	12 - 20
0.075	70	835.0	92.27	7.73	4 - 10
Pan	70.0				
Total	905.0				

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Authorised Signatory

DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	03.08.2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.821	0.823	0.810
Final weight of plate after application of tack Coat (c)	Kg	0.844	0.846	0.833
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.250	0.256	0.251
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement to Drains and Asphalting to Roads at Hegadenagara Westren Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	04.08.2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.822	0.828	0.815
Final weight of plate after application of tack Coat (c)	Kg	0.845	0.851	0.838
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.250	0.256	0.251
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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Authorised Signatory

BRUHATH BANGALORE MAHANAGARA PALIKE
Byatarayanapura Division

Name of the work: Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

First and Part Bill
Test Reports

AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers and Project Pvt. Ltd.		
Proposed Use	WMM	**Date of Sampling**	**14.10.2018**
Sample Location	**At plant**	**Date of Testing**	**14.10.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	353.00	341.00	352.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	270.00	278.00	275.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	83.00	63.00	77.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	23.51	18.48	21.88	
5	Average Aggregate impact value	(%)	21.29			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers and Project Pvt. Ltd.		
Proposed Use	WMM	**Date of Sampling**	**15.10.2018**
Sample Location	**At plant**	**Date of Testing**	**15.10.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	360.00	345.00	362.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	278.00	272.00	278.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	82.00	73.00	84.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	22.78	21.16	23.20	
5	Average Aggregate impact value	(%)	22.38			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	14.10.2018
		Date of Testing	14.10.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	852	75	777	57
16.0	12.5	1200	117	1083	120
12.5	10.0	450	76	374	62
10.0	6.3	501	65	436	39
Total		**3003**	**333**	**2670**	**278**

Note: Minimum 200 Pcs should be taken on each fraction of test

	Flakiness Index(%):	11.09
	Elongation Index(%):	10.41
	Combined FI+EL (%)	21.50

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	15.10.2018
		Date of Testing	15.10.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	855	76	779	58
16.0	12.5	1200	118	1082	122
12.5	10.0	500	78	422	65
10.0	6.3	500	67	433	41
Total		**3055**	**339**	**2716**	**286**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.10
Elongation Index(%):	10.53
Combined FI+EL (%)	21.63

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	15.10.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	15.10.2018
Type of material & Purpose:	WMM	**Date of testing:**	15.10.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	618	618	6.18	93.82	95-100
22.4	2525	3143	31.43	68.57	60-80
11.2	1782	4925	49.25	50.75	40-60
4.75	1458	6383	63.83	36.17	25-40
2.36	1359	7742	77.42	22.58	15-30
0.6	869	8611	86.11	13.89	8.0-22.0
0.075	842	9453	94.53	5.47	0-8
Pan	547				
Total	10000				

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಜಿ.ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	16.10.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	16.10.2018
Type of material & Purpose:	WMM	**Date of testing:**	16.10.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	618	618	6.18	93.82	95-100
22.4	2525	3143	31.43	68.57	60-80
11.2	1782	4925	49.25	50.75	40-60
4.75	1452	6377	63.77	36.23	25-40
2.36	1354	7731	77.31	22.69	15-30
0.6	862	8593	85.93	14.07	8.0-22.0
0.075	842	9435	94.35	5.65	0-8
Pan	565				
Total	10000				

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Project	**Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**15.10.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6169	6421	6208
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3429	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.47	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.20	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.40	103.19	98.17
Compaction Required	98%	98%	98%

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Project	**Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**15.10.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6169	6110	6232
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9731	9735	9718
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3434	3423	3452
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.36	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.09	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.25	98.28	98.63
Compaction Required	98%	98%	98%

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Project	**Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**16.10.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6172	6118	6213
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3429	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.44	98.32	98.25
Compaction Required	98%	98%	98%

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Project	**Improvement to Drains and Asphalting to Roads at Hegadenagara Eastern Side Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**16.10.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6169	6110	6208
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3429	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.35	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.40	98.19	98.17
Compaction Required	98%	98%	98%

Note:
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Authorised Signatory

BRUHATH BANGALORE MAHANAGARA PALIKE
Byatarayanapura Division

Name of the work: Providing and Asphalting in Police Quarter's main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

First and Part Bill
Test Reports

AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers and Project Pvt. Ltd.		
Proposed Use	WMM	**Date of Sampling**	**10.12.2018**
Sample Location	**At plant**	**Date of Testing**	**10.12.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	356.00	350.00	354.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	276.00	280.00	278.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	80.00	70.00	76.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	22.47	20.00	21.47	
5	Average Aggregate impact value	(%)	21.31			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers and Project Pvt. Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	10.12.2018
		Date of Testing	10.12.2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	855	76	779	52
16.0	12.5	1200	114	1086	122
12.5	10.0	460	72	388	64
10.0	6.3	510	78	432	40
Total		**3025**	**340**	**2685**	**278**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.24
Elongation Index(%):	10.35
Combined FI+EL (%)	21.59

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	10.12.2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	10.12.2018
Type of material & Purpose:	WMM	**Date of testing:**	10.12.2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	614	614	6.14	93.86	95-100
22.4	2524	3138	31.38	68.62	60-80
11.2	1786	4924	49.24	50.76	40-60
4.75	1460	6384	63.84	36.16	25-40
2.36	1360	7744	77.44	22.56	15-30
0.6	872	8616	86.16	13.84	8.0-22.0
0.075	862	9478	94.78	5.22	0-8
Pan	522				
Total	10000				

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ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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Project	**Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**Benaka Developers and Project Pvt. Ltd.**

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**11.12.2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6180	6150	6210
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9724	9710	9710
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3441	3448	3460
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.35	2.35
Moisture meter reading(moisture content)	12.50	12.60	12.58
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.18	98.17	98.05
Compaction Required	98%	98%	98%

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	**Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division**		
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**		
Consultant	**M/s Tejus Consultants**		
Contractor	**Benaka Developers and Project Pvt. Ltd**		
Proposed Use	BC	**Date of Sampling**	**18.12.2018**
Sample Location	At plant	**Date of Testing**	**18.12.2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	395.00	380.00	382.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	310.00	300.00	301.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	85.00	80.00	81.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	21.52	21.05	21.20	
5	Average Aggregate impact value	(%)	21.26			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project :	**Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client :	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant :	**M/s Tejus Consultants**
Contractor:	**Benaka Developers and Project Pvt. Ltd.**

Type of Material	BC	**Proposed Use**	**BC**
Sample Location	At plant	**Date of Sampling**	**18.12.2018**
		Date of Testing	**18.12.2018**

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	625	70	555	58
16.0	12.5	1200	115	1085	78
12.5	10.0	500	70	430	60
10.0	6.3	500	52	448	50
Total		**2825**	**307**	**2518**	**246**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.87
Elongation Index(%):	9.77
Combined FI+EL (%)	20.64

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GRADATION FOR BC
(As per MORT&H 500-18,Grading-2)

Name of Work	:	**Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers and Project Pvt. Ltd.
Date of Testing	:	18.12.2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	18.12.2018
Type of material & Purpose:	BC	Date of testing:	18.12.2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	136	136.0	11.33	88.67	79 - 100
9.50	102	238.0	19.83	80.17	71 - 95
4.75	221	459.0	38.25	61.75	53 - 71
2.360	126	585.0	48.75	51.25	42 - 58
1.180	122	707.0	58.92	41.08	34 - 48
0.600	105	812.0	67.67	32.33	26 - 38
0.300	108	920.0	76.67	23.33	18 - 28
0.150	89	1009.0	84.08	15.92	12 - 20
0.075	95	1104.0	92.00	8.00	4 - 10
Pan	96.0				
Total	1200.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work :	Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	19.12.2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	953	924
2. Weight of Mixture after extraction, g	903	876
3. Weight of Bitumen	50	48
4. Weight of filter paper before extraction, g	2.00	2.00
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	1.60	1.90
7. Weight of Bitumen & fines	51.60	49.90
8. Bitumen content in %	5.41	5.40
9. Average Bitumen content in %	**5.41**	
10: Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	At site	Date of Sampling:	19.12.2018
Type of material & Purpose:	**BC**	Date of testing:	19.12.2018
		Oven Dry Wt.(gms):	903.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	90	90.0	9.97	90.03	79 - 100
9.50	118	208.0	23.03	76.97	71 - 95
4.75	134	342.0	37.87	62.13	53 - 71
2.360	120	462.0	51.16	48.84	42 - 58
1.180	106	568.0	62.90	37.10	34 - 48
0.600	70	638.0	70.65	29.35	26 - 38
0.300	76	714.0	79.07	20.93	18 - 28
0.150	58	772.0	85.49	14.51	12 - 20
0.075	70	842.0	93.24	6.76	4 - 10
Pan	61.0				
Total	903.0				

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Providing and Asphalting in Police Quarters main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers and Project Pvt. Ltd.
Date of Testing :	19.12.2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.785	0.789	0.786
Final weight of plate after application of tack Coat (c)	Kg	0.808	0.812	0.809
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.250	0.256	0.251
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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